

REMARKS

Claim Amendments

The present application has claims 1-12 pending. With this response, the Applicants amend claims 1 and 3. Support for the amendments to claim 1 can be found, for example, on page 8, lines 5 and 6, of the application as filed. Support for the amendments to claim 3 can be found, for example, on page 6, lines 22-24, and page 8, lines 18-27, of the application as filed. All amendments are made without prejudice and no new matter has been added to the application.

Claim Objection

The Examiner objects to claim 11 as being dependent upon a rejected base claim. As shown below, claim 11 is now dependent upon an allowable base claim. The Applicants respectfully request that the objection be withdrawn upon the allowance of the base claim (Claim 3).

Claim Rejections – 35 USC § 103

The Examiner rejects claims 1-10 and 12 as being obvious over WO 03/022736 in view of JP 2002-307053 and JP 60-122337.

The cited prior art, in combination, do not disclose either “*An ozone water comprising an aqueous solution containing ozone nano-bubbles which hold ozone therein, the bubbles having diameters of 200 nm or less, with each ozone nano-bubble surrounded by an inorganic shell consisting predominantly of electrolytic ions of iron or the like which inhibits the ozone nano-bubbles from diffusing through the aqueous solution.*” or “*A method for producing an ozone water, comprising the step of instantaneously shrinking bubble diameters of ozone-containing microbubbles with diameter of 10 to 50 μm in an aqueous solution to generate ozone nano-bubbles having diameters of 200 nm or less by the application of a physical irritation to the ozone-containing microbubbles in the aqueous solution and adding electrolytes to the aqueous solution so that the electric conductivity of the aqueous solution reaching 300 μS/cm or more.*” as recited in the claims.

Regarding the method of producing the ozone water (claims 3-12), the Applicants would like the Examiner to be aware of important differences between the claimed invention and the cited prior art.

The present invention is related to the generation of the ozone water by generating the ozone and dissolving the ozone in water at the same time, whereas an ozonizer and a device that dissolves ozone in water were necessary in the prior art

WO 03/022736 is a description of one method of producing of ozone water. However, the bubbles used are oxygen filled, and it is not assumed that they remain as a bubble. Moreover, the size is of the bubbles generated is vague. As a method of lengthening the longevity of the ozone water, the idea of increasing water acidity and dissolving carbon dioxide is adopted in WO

03/022736. Usually, the half-life of the ozone bubbles at pH 3 is ten hours at most.

On the other hand, the present invention describes micro-bubbles of ozone is generated by electrolyzed water. The bubble grain diameter of the micro-bubble thus generated is 10-50 microns. Therefore, the rising speed of the micro-bubble is very slow. The micro-bubble is made even smaller in order to dissolve the internal gas effectively and has the advantage of disappearing in water (complete dissolution). The reduction speed of the micro-bubble is also improved by the addition of physical irritation. As a result, it provides rapidly concentrated ions existing in the gas-liquid interface by the physical irritation while layers of ions stabilize the nano-bubbles having a size of 200 nm or less for an extremely long half-life, so that the dissolution of the internal gas is suppressed. The stabilization of nano-bubble has one month or more shelf-life by preserving it in a typical container.

Usually, the ozone water is generated by making the ozone gas foamed in aqueous solution. However, it is easy to generate ozone as a gas from the ozone water if the insoluble ozone exists as a bubble. Ozone escaping from the ozone water as a gas has a negative effect on a person's respiratory system. Therefore, it is important to remove the insoluble gas from the ozone water. JP2002-307053 is a description of the method of removing the insoluble ozone gas in that a centrifuge and an ultrasonic wave are used.

However, the present invention is object to stabilize in the electrolyte solution minute bubbles (nano-bubbles) after the application of physical irritation, not remove the insoluble ozone.

JP60-122337 describes the method of producing ozone water by a silent electric discharge in water. The problem when the ozone water is made from the ozone gas is to dissolve the gas to water very efficiently. The dissolution efficiency is raised by making the bubble minute by stirring the bubble by the screw and adding the ultrasonic wave in JP 60-122337. Given that the bubbles of JP 06-122337 stay in the water tank for 120 seconds, gives a rise-speed of about 8mm/s. The size of a bubble calculated from that rising velocity is larger than 100 μ m – larger than the nano-bubbles of the claimed invention.

Therefore, one skilled in the art would not be drawn to combine those references in order to produce the claimed invention.

The Applicants respectfully request that the rejection of obviousness be withdrawn for all the claims.

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The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

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October 23, 2009

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